FUJITSU

Data Sheet
1FINITY™ L100 Series

Modular blade family delivers dynamic ROADM functionality

1FINITY L100 Series Lambda Blades at a Glance

- Modular 1RU blade design
- Three blade types: ROADM-on-a-blade, splitter/coupler, and drop-expansion WSS
- CD-ROADM configurations up to 12 degrees
- Web-based GUI, CLI script, or NETCONF API management

Product Overview
Network operators can use the modular blades in the 1FINITY L100 (Lambda) Series to implement scalable, flexible, dynamic ROADMs. The modular 1RU design of these blades affords an open, simple, scalable architecture that easily accommodates rapid bandwidth growth.

The flexibility of the mesh network in a ROADM-driven optical system can be extended by employing colorless and directionless features at every node. Wavelengths can be assigned to any port and any degree to connect to a shared drop side. The 1FINITY L100 Series allows maximum flexibility when designing or upgrading multidegree ROADM networks.

Each lambda blade provides specific ROADM functionality that designers can combine to build a colorless, directionless (CD) ROADM network node. A scalable module can be added for drop-side port expansion with 2–12 degrees and up to 960 ports. In addition, the Lambda blades use the latest wavelength-selective switching (WSS) technology for flex-grid operation and super-channel support. With the challenges of providing scalability and dynamic reconfiguration, the 1FINITY Lambda blades provide effective, high-density, pay-as-you-grow solutions.

Lambda Blade Family
The 1FINITY Lambda Series consists of three types of blades: a ROADM on a blade, a splitter/coupler, and a drop-expansion wavelength-selective switch (WSS). Designers can use combinations of these blades to build right-sized dynamic ROADM networks.

1FINITY L100 and L130 ROADM-on-a-blade
The ROADM-on-a-blade units provide an advanced route-and-select architecture that supports small to large CD-ROADM nodes. A single ROADM-on-a-blade supports all optical span distances and one degree. Networks can be scaled to provide additional degrees simply by adding one or more blades.

- The L100 blade holds a twin 1 x 9 WSS and universal amplifier module that supports nodes up to 4 degrees and up to 128 clients.
- The L130 blade holds a twin 1 x 20 WSS and universal amplifier module that supports nodes up to 12 degrees and 864 clients.

1FINITY: A Revolutionary, Disaggregated Platform
For network operators seeking an open, simple, scalable architecture to meet escalating bandwidth demand, Fujitsu provides 1FINITY, a revolutionary disaggregated platform that delivers unprecedented flexibility, scalability, and efficiency. Unlike the traditional converged systems other vendors provide, the programmable, blade-centric design of 1FINITY offers operators a pay-as-you grow approach with low initial investment. Additional benefits include high rack space utilization; evergreen technology design; operational convergence; and open, pluggable optics, APIs, and protocols.

Scalable ROADM Configurations

1FINITY L110 – Splitter/Coupler

The L110 blade is an optical muxponder base with dual plug-in splitter/coupler modules. Each module has 16 client ports to configure different CD-ROADM nodes:

- Pluggable dual 4 x 16 splitter/coupler modules in the L110 blade are used with the L100 ROADM-on-a-blade, supporting nodes up to 4 degrees.
- Pluggable dual 1 x 16 splitter/coupler modules are used in the L110 blade with the L100 ROADM-on-a-blade and L120 WSS blades to support nodes up to 8 degrees, or with the L130 ROADM-on-a-blade and L120 WSS blades to support nodes up to 12 degrees.

1FINITY L120 - MxN WSS

The L120 WSS blade is an optical switch with a twin 12 x9 WSS that also accepts one splitter-coupler PIU. Used with the L130 ROADM-on-a-blade and dual 1 x 16 modules of the L110 splitter/coupler modules, the L120 blade supports additional degrees and client ports; enabling node configurations up to 12 degrees.

A fiber distribution panel enables and simplifies fiber interconnections between the ROADM-on-a-blade and WSS blades.

Modular ROADM Platform

The channel count and number of degrees you require determine the ROADM network configuration and lambda family blade selection. The lambda blades support multiple configurations, from small 2–4 degree add/drop ROADMs to nodes as large as 12 degrees.

To ensure a competitive, scalable network, Fujitsu has formulated three ROADM network configurations that provide the best combinations of price and performance (see figures 3–6). These configurations, when integrated with 1FINITY transport blades or another transponder, can be used to implement a full CD-ROADM network.

Simplified Network Operations

Lambda blades employ a Linux-based operating system and can be managed with a Web-based GUI, a CLI script, or a NETCONF API. The GUI or CLI script can provision numerous service options. The NETCONF management API makes it easy to use lambda blades with SDN network controllers, including Fujitsu Virtuora® NC.
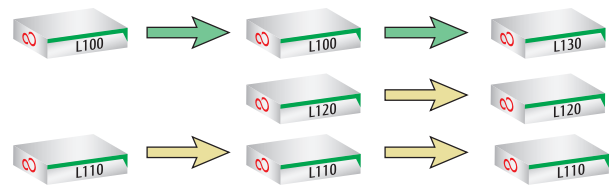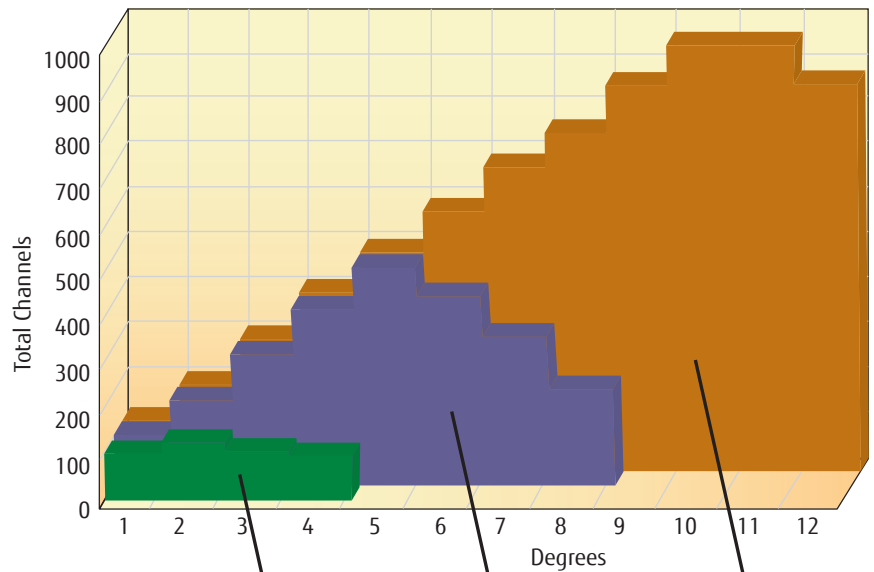
1FINITY Lambda Blade Family

Figure 1: 1FINITY L100 ROADM on a blade with twin 1 × 9 WSS and universal amplifier

Figure 2: 1FINITY L110 dual 4 × 16 optical muxponder base with dual 4 x 16 splitter/coupler modules (not shown: 1 × 16 splitter/coupler)

Figure 3: CD-ROADM node configurations

CD ROADM Nodes from 2 to 12 Degrees

Colorless Nano ROADM Node

- Lambda blades
  - L100: One ROADM-on-a-blade
- Capabilities:
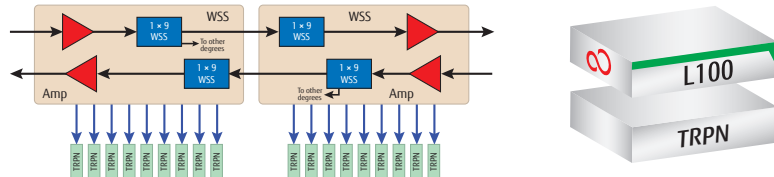 - 2-degree support
  - Up to 8 clients
- Available in release 3.2

Figure 4: Colorless Nano ROADM node configuration with transponders

≤4-Degree CD ROADM Node

- Lambda blades
  - L100: One ROADM-on-a-blade per degree up to 4 degrees
  - L110: One or more dual 4 ×16 splitter/couplers
- Capabilities:
  - Up to 4-degree support
  - Up to 128 clients
- 2-degree ROADM available in release 2.2
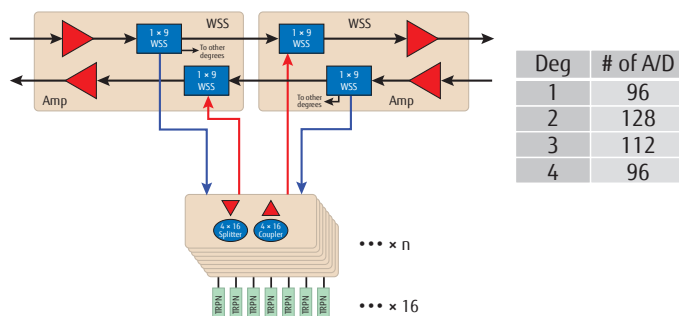- 4-degree ROADM available in R3.2

Deg	# of A/D
1	96
2	128
3	112
4	96

Figure 5: ≤4-degree CD-ROADM node configuration with transponders

≤8-Degree CD-ROADM Node

- Lambda blades
  - L100: One ROADM-on-a-blade per degree up to 8 degrees
  - L110: One or more dual 1 × 16 splitter/couplers
  - L120: One or more twin 12 × 9 WSSs
- Capabilities:
  - Up to 8-degree support
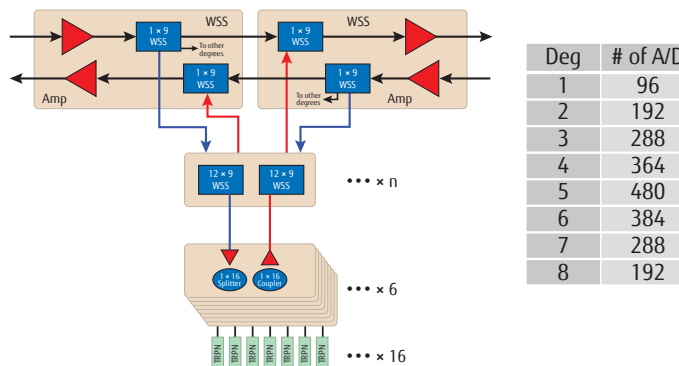 - Up to 480 clients
- Available in release R3.2

Deg	# of A/D
1	96
2	192
3	288
4	364
5	480
6	384
7	288
8	192

Figure 6: ≤8-degree CD-ROADM node configuration with transponders

≤12-Degree CD-ROADM Node

- Lambda blades
  - L130: One ROADM-on-a-blade per degree up to 12 degrees
  - L110: One or more dual 1 × 16 splitter/couplers
  - L120: One or more twin 12 × 9 WSSs
- Capabilities:
  - Up to 12-degree support
  - Up to 960 clients
- Available in future releases

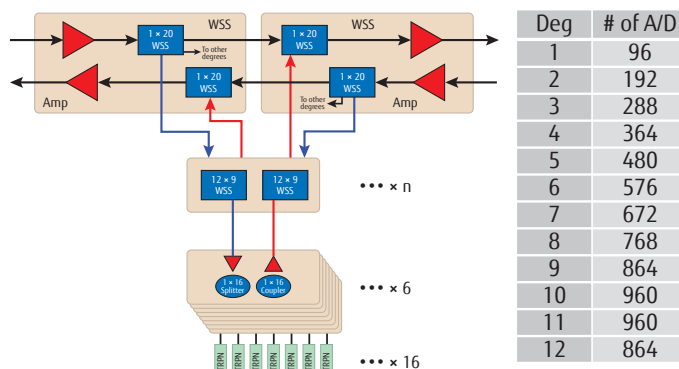| Deg	# of A/D
1	96
2	192
3	288
4	364
5	480
6	576
7	672
8	768
9	864
10	960
11	960
12	864

Figure 7: ≤12-degree CD-ROADM node configuration with transponders

Technical Specifications

Base System

System Configuration	Modular 1RU blade
Local Management Port (LMP)	10/100 Mbps Ethernet RJ-45 x 1
Management Port (LCN)	4 x Gigabit Ethernet SFP (T, SX, LX, EX, ZX)
Front LEDs	System Status, Severity, and Port
Fans	2 replaceable fans
Power Supply	Dual fixed power supplies

Line Optics

Line Ports per Blade	1
Line Rate	100 Gbps 200 Gbps, future 400 Gbps
Optical Module	Fixed
Tx Wavelength	1528.77–1566.77
Rx Wavelength	1528.77–1566.77

Performance Monitoring

Service PMs	24-hour, 15-minute
OTN PMs	NA
Thresholds and TCA	Supported (user assignable)

Management

Virtuora NC	Yes
Web GUI	Yes
CLI	Yes
NETCONF/YANG	Yes
SNMP	SNMPv2
NTP, SNTP, Telnet, and FTP	Telnet, FTP and SFTP R1.1, NTP
In Band Mgmt	OSC
OSMINE Support	CLEI

Physical Characteristics

Dimensions H x W x D	1.75 x 19 x 17.72" (44.45 x 483 x 450 mm) W = 19" or 23" with mounting rails D<600 mm with fiber management
Weight	• L100 chassis: 8.10 kg (17.857 lbs) • L110 chassis: 6.08 kg (13.404 lbs) • 4 x 16 PIU: 1.58 kg (3.483 lbs)
Rack Compatibility	19 and 23"

LASER SAFETY CLASSIFICATION AND CAUTION
The 1FINITY L100 and L110 comply with the Laser IEC/EN 60825-1, -2 standards

Operating Environment

Operating Temperature	+5 to +40 ℃
Short Term Temperature	−5 to +50 ℃
Humidity, Normal Operating	5% to 85% noncondensing
Humidity	5% to 93% noncondensing

Power

Power Supply	Dual feed, fixed power supplies
120 V AC	No
−48 V DC	−40 V DC to −57 V DC
Power Dissipation	• L100: 180 W (typical) • L110: 125 W (typical)

Regulatory and Compliance

FCC	FCC Part 15, Class A
NEBS	NEBS Level 3
UL/CSA	UL/CSA 60950-1
RoHS	RoHS
CE	CE
IEC/EN	IEC/EN 60825-1, 60825-2
WEEE	WEEE
RCM	RCM
CDRH	FDA CDRH

ROADM Capacity and Functions

Configuration	• Colorless, directionless (CD) ROADM • Colorless 8-channel ROADM option
ROADM Degrees	Up to 12
Topology	P-to-P, Linear, Ring, Mesh
Wavelengths	100G, 200G, future 400G and above
Wavelength Range	1528.77–1566.77 nm
Maximum Channels per Degree	• 96 (50GHz ITU-T fixed grid) • 128 (flex-grid)
Maximum System Capacity	25.6T (200G x 128 channels) per degree
Span Loss	0–35 dB
Optical Supervisory Channel (OSC)	OC-3, 100 Mbps Ethernet, Gigabit Ethernet

CLASS 1M CAUTION
Invisible laser radiation: Class 1M laser product
Do not view directly with optical instruments
HAZARD LEVEL 1M CAUTION
Hazard level 1M laser radiation
Do not view directly with non-attenuating optical instruments

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